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(54) Titre : MATIERES SOUS FORME DE GELS A BASE DE POLYURETHANNE, LEUR PRODUCTION ET LEUR
UTILISATION
(54) Title: POLYURETHANE-BASED GEL MASSES, THEIR PRODUCTION AND USE

(57) **Abrégé/Abstract:**

The present invention relates to improved gel masses based on a reaction mixture of NCO prepolymers and selected compounds having groups that are reactive towards isocyanate groups, to a method of producing these gel masses and to their use in pressure-distributing elements.



Abstract

The present invention relates to improved gel masses based on a reaction mixture of NCO prepolymers and selected compounds having groups that are reactive towards
5 isocyanate groups, to a method of producing these gel masses and to their use in pressure-distributing elements.

Gel masses based on polyurethane, their production and use

5 The present invention relates to improved gel masses based on a reaction mixture of NCO prepolymers and selected compounds containing groups reactive towards isocyanate groups, to a process for the production of these gel masses and to their use in pressure-distributing elements.

10 Gel masses for use in pressure-distributing elements, e.g. in cushions for wheelchairs, are principally described as being based on polyvinyl chloride, polyorganosiloxanes and polyurethanes, i.e. reaction products of polyols and polyisocyanates. Gel masses based on polyurethanes, such as those described e.g. in EP-A 057 838, have proved particularly advantageous for specifically adapting the properties to the particular intended use. Such polyurethane gels, which can be
15 obtained from polyols of high molecular weight (hydroxyl number: 20 to 112) and polyisocyanates, have the disadvantage that the two reaction components have to be mixed in very different amounts. Therefore, in the mechanical production of the gels, the polyisocyanate component, which has to be used in comparatively small amounts, must be proportioned very accurately and with minimal fluctuations; otherwise, inhomogeneous gel masses with different consistencies are obtained.

20 By contrast, EP-A 511 570 describes polyurethane gel masses for which the components are used in a mixing ratio that allows a homogeneous blending of the components, especially when high-pressure machines are employed. The polyol component consists of a mixture of polyols with hydroxyl numbers below 112 and
25 polyols with hydroxyl numbers ranging from 112 to 600. The isocyanate index of the reaction mixture ranges from 15 to 59.81 and the product of isocyanate functionality and polyol functionality is at least 6.15. One disadvantage of these gel masses is that the mechanical properties can only be varied within narrow limits. Thus, for a low hardness (e.g. Shore 00 < 40), only a very limited recovery capacity
30 can be achieved. Recovery capacity is understood as meaning the time taken by a shaped gel body to return to its initial height after a vertical compression of 50%. The very limited recovery capacity greatly restricts the possible fields of use of such gels.

35 EP-A 282 554 describes skin-friendly gel masses with inherent stickiness which can be used e.g. in skin plasters. The gel masses are obtained by reacting NCO prepolymers (prepared by reacting a polyisocyanate with a polyoxyalkylenediol monoalkyl ether) and a hydroxyl-containing compound, e.g. water or a polyol. The

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polyols used can be, inter alia, diols which are reacted in stoichiometric amounts with the NCO prepolymer. One disadvantage of these gel masses is that the mechanical properties can only be varied within narrow limits. Thus, if an attempt is made to obtain a low hardness (e.g. Shore 00 < 40), for example by reducing the index, the resulting gel masses have a low recovery capacity or even dimensional instability.

The object of the present invention was therefore to provide gel masses which have low hardnesses and a good recovery capacity and whose mechanical properties can be varied within wide limits. At the same time it should be possible to blend the components homogeneously when employing high-pressure machines since this is the only way in which rapid, reactive gel systems can be processed.

Surprisingly, improved gel masses have been found which do not exhibit the disadvantages described above and which achieve the object with outstanding results.

The invention provides gel masses based on a reaction mixture of NCO prepolymers and polyol components which is characterized in that

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a) the NCO prepolymers used are obtainable from polyisocyanates with a functionality of 2.1 to 5 and polyoxyalkylenediol monoalkyl ethers with a molecular weight of 1000 to 18,000, the ratio of NCO groups to OH groups being between 2:1 and 8:1, and

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b) the polyol components have a mean hydroxyl number of 6 to 112 and a formal functionality of 3 to 8,

the index of the reaction mixture ranging from 15 to 60.

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The gel masses according to the invention are produced by reacting NCO prepolymers and polyol components. The NCO prepolymer used is prepared from polyisocyanates with a functionality of 2.1 to 5 and polyoxyalkylenediol monoalkyl ethers with a molecular weight of 1000 to 18,000, the ratio of NCO to OH groups being between 2:1 and 8:1. The polyol components used have a mean hydroxyl number of 6 to 112 and a formal functionality of 3 to 8. The index of the reaction mixture ranges from 15 to 60. Index is understood as meaning the equivalent ratio

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of NCO groups to OH groups, multiplied by 100. Thus, for example, an index of 15 means that there is 0.15 reactive NCO group from the prepolymers to one reactive OH group from the polyols, or that there are 6.67 reactive OH groups from the polyols to one reactive NCO group from the prepolymers.

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The components for producing the gel masses according to the invention can be used in a mixing ratio that allows a homogeneous blending of the components, especially when employing high-pressure machines. The use of high-pressure machines also makes it possible to process rapid, reactive gel systems and hence to produce shaped gel bodies economically with long cycle times. Furthermore, the mechanical properties of the gel masses can be varied within wide limits. Thus, for a low hardness (Shore 00 < 40), it is possible to achieve good recovery capacities, as required e.g. for pressure-distributing supports in antidecubitus cushions, armrests, shoe insoles, office chairs, mattresses and bicycle saddles.

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In general the gel masses according to the invention are preferably anhydrous and can optionally also contain fillers known per se from polyurethane chemistry, in amounts of 0 – 50 wt.%, based on the total weight of the gel mass. The gel masses can optionally also contain auxiliary substances and additives in amounts of 0 – 25 wt.%, based on the gel masses. Catalysts can optionally be present in amounts of 0 – 5 wt.%, based on the gel mass.

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The present invention also provides a process for the production of gel masses which is characterized in that

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a) one or more NCO prepolymers prepared from polyisocyanates with a functionality of 2.1 to 5 and polyoxyalkylenediol monoalkyl ether with a molecular weight of 1000 to 18,000, the NCO/OH ratio being between 2:1 and 8:1, are reacted with

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b) a polyol component consisting of one or more polyols with a mean hydroxyl number of 6 to 112 and a formal functionality of 3 to 8, in the presence of

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c) optionally 0 – 5 wt.%, based on the gel mass, of one or more catalysts for the reaction between isocyanate groups and hydroxyl groups, and

d) optionally 0 – 50 wt.%, based on the gel mass, of fillers, and

e) optionally 0 – 25 wt.%, based on the gel mass, of auxiliary substances and/or additives,

5 the index of the reaction mixture ranging from 15 to 60.

The polyisocyanates for preparing the starting components a) are preferably aliphatic, cycloaliphatic or aromatic polyisocyanates and particularly preferably diisocyanates and/or polyisocyanates of the diphenylmethane series that are liquid at
10 room temperature. These include mixtures of 4,4'-diisocyanatodiphenylmethane with 2,4'- and optionally 2,2'-diisocyanatodiphenylmethane that are liquid at room temperature and have optionally been modified accordingly. Also suitable are polyisocyanate mixtures of the diphenylmethane series which contain not only said isomers but also higher homologues thereof, and which are obtainable in a manner
15 known per se by the phosgenation of aniline/formaldehyde condensates, said mixtures being liquid at room temperature. Modified products of these diisocyanates and polyisocyanates containing urethane groups and/or carbodiimide groups are also suitable. Modified products of said diisocyanates and polyisocyanates containing allophanate groups or biuret groups are also suitable.
20 The polyisocyanate component has a mean NCO functionality of 2.1 to 5.0 and preferably of 2.5 to 3.1.

The polyoxyalkylenediol monoalkyl ethers for preparing the starting components a) are poly(oxyalkylene)polyols, which can be prepared in a manner known per se by
25 the polyaddition of alkylene oxides onto monofunctional starter compounds in the presence of catalysts. Preferred starter compounds, which can be used on their own or in a mixture, are molecules containing one hydroxyl group per molecule, such as ethanol, propanol, butanol and butyl diglycol. Monoalkyl ethers containing an alkyl group having 1 to 18 carbon atoms, preferably 2 to 6 carbon atoms and particularly
30 preferably 4 carbon atoms, i.e. monobutyl ethers, are obtained in this way. The poly(oxyalkylene)polyols used according to the invention are preferably prepared from one or more alkylene oxides, the alkylene oxides used preferably being oxirane, methyloxirane and ethyloxirane. These can be used on their own or in a mixture. When used in a mixture, the alkylene oxides can be reacted randomly or in blocks or
35 both in succession. It is preferable to use a mixture of propylene oxide and ethylene oxide to prepare the polyoxyalkylenediol monoalkyl ethers according to the invention with a number-average molecular weight of 1000 to 18,000 g/mol and

preferably of 1000 to 3000 g/mol.

5 The polyisocyanate prepolymers a) used are prepared by heating the polyisocyanates and the polyoxyalkylenediol monoalkyl ethers in the indicated NCO/OH ratio (between 2:1 and 8:1), optionally in the presence of a catalyst, until the reaction has ended.

10 Apart from its function as a structural component for the polyurethane matrix, the polyol component b) also plays the role of a dispersant. The polyols to be used can preferably be polyhydroxypolyethers, -polyesters, -polythioethers, -polyacetals, -polycarbonates, -polyesteramides, -polyamides or -polybutadienes that are known per se in polyurethane chemistry and are liquid at 10 to 60°C. Polyhydroxyl compounds already containing urethane groups or urea groups, as well as optionally modified natural polyols such as castor oil, can also be used as the polyol component. Of course, it is also possible to use mixtures of the aforementioned compounds, e.g. mixtures of polyhydroxypolyethers and polyhydroxypolyesters.

20 The polyols b) used are preferably polyhydroxypolyethers, which can be prepared in a manner known per se by the polyaddition of alkylene oxides onto polyfunctional starter compounds in the presence of catalysts. The poly(oxyalkylene)polyols used according to the invention are preferably prepared from a starter compound having an average of 3 to 8 active hydrogen atoms and one or more alkylene oxides. Preferred starter compounds are molecules containing three to eight hydroxyl groups per molecule, such as triethanolamine, glycerol, trimethylolpropane, pentaerythritol, sorbitol and sucrose. The starter compounds can be used on their own or in a mixture, inter alia with difunctional starter compounds such as diethylene glycol, dipropylene glycol, triethylene glycol, tripropylene glycol, 1,4-butanediol and 1,6-hexanediol. The polyols b) used according to the invention are prepared from one or more alkylene oxides. The alkylene oxides used are preferably oxirane, methyl-oxirane and ethyloxirane. These can be used on their own or in a mixture. When used in a mixture, the alkylene oxides can be reacted randomly or in a block or both in succession. Also suitable are higher-molecular polyhydroxypolyethers in which high-molecular polyadducts/polycondensates or polymers are present in finely dispersed, dissolved or grafted form. Such modified polyhydroxyl compounds are obtained e.g. when polyaddition reactions (e.g. reactions between polyisocyanates and amino-functional compounds) or polycondensation reactions (e.g. between formaldehyde and phenols and/or amines) are allowed to proceed in situ in the

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compounds containing hydroxyl groups (as described e.g. in DE-AS 1 168 075). Polyhydroxyl compounds modified by vinyl polymers, such as those obtained e.g. by the polymerization of styrene and acrylonitrile in the presence of polyethers (e.g. according to US-PS 3 383 351), are also suitable as the polyol component b) in the process according to the invention. Representatives of said compounds to be used according to the invention as the starting component b) are described e.g. in Kunststoff-Handbuch, volume VII "Polyurethane", 3rd edition, Carl Hanser Verlag, Munich/Vienna, 1993, pages 57 – 67 or pages 88 – 90.

10 Preferably, the polyol component b) used consists of one or more polyhydroxy-polyethers with a mean hydroxyl number of 6 to 112 and a formal functionality of 3 to 8 and preferably of 3 to 6.

15 The gel formation reaction, which inherently proceeds slowly, can optionally be accelerated by the addition of catalysts, it being possible to use catalysts known per se which accelerate the reaction between hydroxyl groups and isocyanate groups. Tertiary amines of the type known per se are particularly suitable, examples being triethylamine, tributylamine, N-methylmorpholine, N-ethylmorpholine, N-coco-morpholine, N,N,N',N'-tetramethylethylenediamine, 1,4-diazabicyclo[2.2.2]octane, 20 N-methyl-N'-dimethylaminoethylpiperazine, N,N-dimethylcyclohexylamine, N,N,N',N'-tetramethyl-1,3-butanediamine, N,N-dimethylimidazole- β -phenylethylamine, 1,2-dimethylimidazole or 2-methylimidazole. Organic metal catalysts, especially organic bismuth catalysts, e.g. bismuth(III) neodecanoate, or organic tin catalysts, e.g. tin(II) salts of carboxylic acids, such as tin(II) acetate, tin(II) octoate, 25 tin(II) ethylhexanoate and tin(II) laurate, and the dialkyltin salts of carboxylic acids, such as dibutyltin diacetate, dibutyltin dilaurate, dibutyltin maleate or dioctyltin diacetate, can also be used, either on their own or in combination with the tertiary amines. It is preferable to use 0 to 5 wt.%, especially 0.3 to 2.0 wt.%, of catalyst or catalyst combination, based on the gel mass. Other representatives of catalysts and details of the mode of action of the catalysts are described in Kunststoff-Handbuch, 30 volume VII "Polyurethane", 3rd edition, Carl Hanser Verlag, Munich/Vienna, 1993, pages 104 – 110.

35 Fillers which are optionally to be used concomitantly can be either inorganic or organic. Examples of inorganic fillers which may be mentioned are silicate minerals, e.g. sheet silicates, metal oxides such as iron oxides, especially pyrogenic metal oxides like Aerosils (as described in EP-B 1 125 975), metal salts such as

barite, inorganic pigments such as cadmium sulfide and zinc sulfide, and glass, glass microspheres, hollow glass microspheres, etc. It is possible to use natural and synthetic fibrous minerals such as wollastonite and glass fibres of different length, which can optionally be sized. Examples of organic fillers which may be mentioned
5 are crystalline paraffins or fats (phase change materials) (as described in EP-B 1 277 801) and powders based on polystyrene, polyvinyl chloride, urea/formaldehyde compounds and/or polyhydrazodicarboxamides (obtained e.g. from hydrazine and toluene diisocyanate). It is possible here, for example, for urea/formaldehyde resins or polyhydrazodicarboxamides to have been prepared
10 directly in a polyol that is to be used for the production of gel masses according to the invention. Hollow microspheres of organic origin (as described in EP-B 1 142 943) or cork (as described in DE 100 24 087) can also be added. The organic or inorganic fillers can be used individually or as mixtures. If used at all, the fillers are added to the reaction mixture in amounts of 0 to 50 wt.% and preferably of
15 0 to 30 wt.%, based on the total weight of the gel mass.

The auxiliary substances and additives which are optionally used concomitantly include e.g. colouring agents, water-binding substances, flameproofing agents, plasticizers and/or monohydric alcohols.

20 Examples of colouring agents which the gel masses according to the invention can contain are organic and/or inorganic dyestuffs and/or coloured pigments known per se for the colouring of polyurethanes, e.g. iron oxide and/or chromium oxide pigments and phthalocyanine and/or monoazo pigments.

25 Suitable water-binding substances are both compounds that are highly reactive towards water, e.g. tris(chloroethyl) orthoformate, and water-binding fillers, e.g. alkaline earth metal oxides, zeolites, aluminium oxides and silicates. Suitable synthetic zeolites are marketed e.g. under the name Baylith®.

30 Examples of suitable flameproofing agents which are optionally to be used concomitantly are tricresyl phosphate, tris-2-chloroethyl phosphate, tris-chloropropyl phosphate and tris-2,3-dibromopropyl phosphate. Apart from the halogen-substituted phosphates already mentioned, it is also possible to use inorganic
35 flameproofing agents such as aluminium oxide hydrate, ammonium polyphosphate, calcium sulfate, sodium polymetaphosphate or amine phosphates, e.g. melamine phosphates.

Examples of plasticizers which may be mentioned are esters of polybasic carboxylic acids, preferably dibasic carboxylic acids, with monohydric alcohols. The acid component of such esters can be derived e.g. from succinic acid, isophthalic acid, trimellitic acid, phthalic anhydride, tetrahydrophthalic and/or hexahydrophthalic anhydride, endomethylenetetrahydrophthalic anhydride, glutaric anhydride, maleic anhydride, fumaric acid and/or dimeric and/or trimeric fatty acids, optionally in a mixture with monomeric fatty acids. The alcohol component of such esters can be derived e.g. from branched and/or unbranched aliphatic alcohols having 1 to 20 C atoms, such as methanol, ethanol, propanol, isopropanol, n-butanol, sec-butanol, tert-butanol and the various isomers of pentyl alcohol, hexyl alcohol, octyl alcohol (e.g. 2-ethylhexanol), nonyl alcohol, decyl alcohol, lauryl alcohol, myristyl alcohol, cetyl alcohol and stearyl alcohol, and/or from naturally occurring fatty and waxy alcohols or fatty and waxy alcohols obtainable by the hydrogenation of naturally occurring carboxylic acids. Other suitable alcohol components are cycloaliphatic and/or aromatic hydroxyl compounds, e.g. cyclohexanol and homologues thereof, phenol, cresol, thymol, carvacrol, benzyl alcohol and/or phenylethanol. Other suitable plasticizers are esters of the aforementioned alcohols with phosphoric acid. Optionally, phosphoric acid esters of halogenated alcohols, e.g. trichloroethyl phosphate, can also be used. In the latter case a flame-inhibiting effect can be achieved simultaneously with the plasticizing effect. Of course, it is also possible to use mixed esters of the aforementioned alcohols and carboxylic acids. The plasticizers can also be so-called polymeric plasticizers, e.g. polyesters of adipic, sebacic and/or phthalic acid. Alkylsulfonic acid esters of phenol, e.g. phenyl paraffinsulfonate, can also be used as plasticizers.

Other additives which are optionally to be used concomitantly are monohydric alcohols such as butanol, 2-ethylhexanol, octanol, dodecanol or cyclohexanol, which can optionally be used concomitantly for the purpose of bringing about a desired chain termination.

If used at all, the additives are incorporated into the reaction mixture in amounts of 0 to 25 wt.% and preferably of 0 to 10 wt.%, based on the total weight of the gel mass. Further details of the conventional auxiliary substances and additives can be found in the scientific literature, e.g. *Kunststoff-Handbuch*, volume VII "Polyurethane", 3rd edition, Carl Hanser Verlag, Munich/Vienna, 1993, page 104 et seq.

The gel masses according to the invention can be used e.g. as pressure-distributing elements. For this purpose it is generally necessary to provide the gel masses with a partial coating, covering or sheathing on one or all sides. To maximize the pressure-distributing action of the gel masses, it is advantageous to use elastic, stretchable sheathing materials. Elastic sheets are particularly suitable for this purpose, an example being polymer sheets with a good viscoplastic behaviour, a high elongation at tear and a high tear strength, e.g. polyurethane sheets. Other suitable sheaths are coated, elastic textile fabrics such as woven and knitted fabrics or nonwovens made of natural or synthetic organic or inorganic fibrous materials of elastic character. Flexible sheathings can also be obtained by coating the gel mass with a two-component lacquer that forms a polyurethane. For applications where the specifically adjustable adhesiveness of the gel masses is to be utilized, e.g. in the case of supports on human or animal body surfaces, only a partial or one-sided coating or covering is required. This is the case particularly for single-use applications.

In principle, gel masses can be produced in a variety of ways, e.g. by the one-shot process or the prepolymer process. In the one-shot process all the components, e.g. polyols, polyisocyanates, optionally catalysts and optionally fillers and/or additives, are brought together at the same time and intimately mixed with one another. In the prepolymer process the first step is to prepare an isocyanate prepolymer by reacting part of the polyol with all the polyisocyanate intended for gel formation, after which the remaining polyol and optionally catalyst, fillers and/or additives are incorporated into the resulting prepolymer and the ingredients are intimately mixed. The prepolymer process is particularly preferred in terms of the present invention. Here the components b) to e) are mixed to form a "polyol component", which is then processed with the polyisocyanate prepolymer a). The catalysts, fillers, auxiliary substances and additives which are optionally to be used concomitantly are generally added to the "polyol component", but this is not absolutely necessary since catalysts, fillers, auxiliary substances and additives which are compatible with the polyisocyanate component a) can also be incorporated into said polyisocyanate component.

The mixture formed by thorough mixing of the reaction components is introduced into the appropriate mould. This involves the feeding, proportioning and mixing of single components or component mixtures using the devices known per se in polyurethane chemistry. The amount of mixture introduced into the mould is

generally measured so that the shaped bodies have a density of 1.0 to 1.2 g/cm³. In the particular case of the concomitant use of mineral fillers, the resulting shaped bodies can have a density of more than 1.2 g/cm³. The starting temperature of the mixture introduced into the mould is generally chosen within the range from 20 to 80°C and preferably from 40 to 60°C. The temperature of the mould is generally 20 to 100°C and preferably 40 to 60°C. Depending on the reaction components, added catalysts and temperature profile, the time to completion of the gel formation and demoulding of the shaped bodies can be from 1 minute to 12 hours and preferably from 3 to 10 minutes.

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The gel masses according to the invention have the property of deforming under pressure, thereby distributing the pressure, i.e. lowering the pressure peaks, and of returning to their initial state after the deforming force has been removed. In particular, they have the characteristics of low hardness and high elasticity, so they can be used in a variety of ways, e.g. as gel cushions in orthopaedic shoes and sports shoes, on bicycle saddles, under riding saddles, on wheelchairs and sick beds, on sitting areas, back areas, headrests and armrests of seating furniture, especially office chairs, in mattresses, car seats or other seats, and on operating tables or medical examination tables. Furthermore, pressure-distributing elements which consist of a gel mass according to the invention with a one-sided covering or coating, and have a high adhesiveness, can be used especially on body surfaces of humans and animals. They are used e.g. as supports on elbows, shins or foot surfaces for avoiding and reducing the effects of injuries, especially in sport, as supports for cosmetic masks, e.g. face masks, as self-adhesive coverings for securing eye or ear dressings, as supports for loose breast tissue, and as cushioning under riding saddles, on prostheses or on nappies in order to prevent pressure sores. The invention will be illustrated in greater detail with the aid of the following Examples.

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Examples

The following polyols and NCO prepolymers were used in the Examples:

5 Polyol 1: polyetherpolyol prepared by the propoxylation of 1,2-propylene glycol; OH number: 56, functionality: 2.

Polyol 2: polyetherpolyol prepared by the propoxylation of glycerol; OH number: 56, functionality: 3.

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Polyol 3: polyetherpolyol prepared by the propoxylation of sorbitol and subsequent ethoxylation of the alkoxylation product; OH number: 28.5, functionality: 6.

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Polyol 4: polyetherpolyol prepared by the propoxylation of sorbitol and subsequent ethoxylation of the alkoxylation product; OH number: 100, functionality: 6.

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NCO prepolymer 1: prepolymer from Desmodur[®] 44V10 (product of Bayer MaterialScience AG; NCO content: 31.8%, mean NCO functionality: 2.8, viscosity (25°C): 100 mPa.s) and Desmophen[®] VP.PU 50RE93 (product of Bayer MaterialScience AG; number-average molecular weight: 1700 g/mol, functionality: 1) in an NCO/OH ratio of 4:1 (theoretical NCO content: 5.8%).

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NCO prepolymer 2: prepolymer from Desmodur[®] 44V10 (product of Bayer MaterialScience AG; NCO content: 31.8%, mean NCO functionality: 2.8, viscosity (25°C): 100 mPa.s) and Desmophen[®] VP.PU 50RE93 (product of Bayer MaterialScience AG; number-average molecular weight: 1700 g/mol, functionality: 1) in an NCO/OH ratio of 2:1 (theoretical NCO content: 2.2%).

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Catalyst 1: bismuth(III) neodecanoate (Coscat[®] 83, C.H. Erbslöh, 47809 Krefeld).

Procedure:

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To prepare the polyisocyanate prepolymer, Desmodur[®] 44V10 and Desmophen[®] VP.PU 50RE93 were mixed in a given NCO/OH ratio and the mixture was reacted for four hours at 80°C and then cooled to room temperature.

The gel mass was produced by first homogenizing 100 parts by weight of polyol and

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1 part of catalyst 1. x parts by weight of NCO prepolymer were then added (see Table 1 for mixing ratio) and the ingredients were mixed for one minute. Solidification of the mixture to form the gel started approx. one minute after the addition of the NCO prepolymer. This gave a flexible gel mass whose dimensional stability, recovery capacity and Shore 00 hardness were determined.

Example	1*	2*	3*	4	5	6	7
Polyol	1	1	2	2	2	3	4
OH number	56	56	56	56	56	28	100
Functionality	2	2	3	3	3	6	6
Index	100	60	100	60	49	60	18
Parts by weight of NCO prepolymer	81	49	81	48	40	39	26
NCO prepolymer	1	1	1	1	1	2	1
Dimensional stability	yes	no	yes	yes	yes	yes	yes
Recovery capacity [sec]	1	—	1	1	2	1	3
Shore 00 hardness	50	— (liquid)	83	39	6	33	1

*comparison

Comparative Examples 1 and 2 illustrate that a dimensionally unstable gel mass is obtained when an attempt is made to obtain a low gel hardness (Shore 00 < 40) by reducing the index.

Claims

1. Gel masses based on a reaction mixture obtainable from NCO prepolymers and polyol components, characterized in that
 - a) the NCO prepolymers used are obtainable from polyisocyanates with a functionality of 2.1 to 5 and polyoxyalkylenediol monoalkyl ethers with a molecular weight of 1000 to 18,000, the ratio of NCO groups to OH groups being between 2:1 and 8:1, and
 - b) the polyol components have a mean hydroxyl number of 6 to 112 and a formal functionality of 3 to 8,the index of the reaction mixture ranging from 15 to 60.
2. Gel masses according to Claim 1, characterized in that the reaction mixture contains fillers in an amount of 0 to 50 wt.%, based on the gel mass.
3. Gel masses according to Claim 1, characterized in that the reaction mixture additionally contains catalysts in an amount of 0 to 5 wt.%, based on the gel mass.
4. Gel masses according to Claim 1, characterized in that the reaction mixture additionally contains auxiliary substances and additives in an amount of 0 to 25 wt.%, based on the gel mass.
5. Process for the production of gel masses according to Claim 1, characterized in that
 - a) one or more NCO prepolymers prepared from polyisocyanates with a functionality of 2.1 to 5 and polyoxyalkylenediol monoalkyl ether with a molecular weight of 1000 to 18,000, the NCO/OH ratio being between 2:1 and 8:1, are reacted with
 - b) a polyol component consisting of one or more polyols with a mean hydroxyl number of 6 to 112 and a formal functionality of 3 to 8, in the presence of

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- c) optionally 0 – 5 wt.%, based on the gel mass, of one or more catalysts for the reaction between isocyanate groups and hydroxyl groups, and
 - 5 d) optionally 0 – 50 wt.%, based on the gel mass, of fillers, and
 - e) optionally 0 – 25 wt.%, based on the gel mass, of auxiliary substances and/or additives,
 - 10 the index of the reaction mixture ranging from 15 to 60.
6. Use of the gel masses according to Claim 1 for the production of pressure-distributing supports or elements.

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